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Notes on Geographic Distribution

Trematoda, Digenea, Didymozoidae, *Wedlia retrorbitalis* (Yamaguti, 1970) and *Wedlia submaxillaris* (Yamaguti, 1970): First record in South America and the Atlantic Ocean

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Abstract: Two species of Didymozoidae originally described from Pacific Ocean, *Wedlia retrorbitalis* and *Wedlia submaxillaris* are reported for the first time in South America, Atlantic Ocean. *W. retrorbitalis* was found encysted in retrorbital adipose tissue and *W. submaxillaris* in the maxillary region of *Thunnus obesus* caught along the Rio de Janeiro coastline, extending their current geographical distribution. Original measurements and figures are presented.

During a survey of the helminth parasites of scombrid fishes from Rio de Janeiro coast, Brazil, two didymozoid species *Wedlia retrorbitalis* (Yamaguti 1970) and *Wedlia submaxillaris* (Yamaguti 1970) were recovered from the retrorbital adipose tissue and maxillary region, respectively, of a *Thunnus obesus* (Lowe 1839) off Rio de Janeiro coast, Southern Atlantic Ocean. These species are reported from Rio de Janeiro coast, Brazil, representing the first record in South America.

Thunnus obesus an epipelagic and mesopelagic species, is found worldwide in tropical and subtropical waters of the Atlantic, Indian and Pacific Oceans, but is absent from the Mediterranean Sea. This species is commonly known as Bigeye tuna or as *Albacora-bandolim* in Brazil and feed on a wide variety of fishes, crustaceans and cephalopods. It is a highly migratory species with a wide distribution and remarkable pelagic activity (Collete and Nauen, 1983).

From January 2004 to April 2007, thirty five *T. obesus* (42 - 80 cm total body length; 1.2 - 8.0 kg) were examined. Fish were obtained from local fishermen from the coastal zone of the state of Rio de Janeiro, Cabo Frio, Brazil (22°52'46" S, 42°01'07" W). Fish were transported on ice to the laboratory of the Instituto de Estudos do Mar Almirante Paulo Moreira - IEAPM, Arraial do Cabo, Rio de Janeiro state, to be examined for the presence of helminth parasites. Fish were identified according to Collette and Nauen (1983), and parasites studied in the Laboratório de Helmintos Parasitos de Peixes, Instituto Oswaldo Cruz - Fiocruz, Rio de Janeiro.

The didymozoid were released from dissected cysts and fixed with or without compression in AFA (alcohol 93 %, formalin 5 %, and acetic acid 2 %), stained in alcoholic-acid carmine, dehydrated in alcohol series, cleared in methyl salicilate and mounted in Canada balsam. Measurements are in micrometers, with the mean in parentheses when more than two. Photomicrographies were taken with a digital camera connected to a Nikon Eclipse E 800 microscope. Parasites were identified following Yamaguti (1970) and Pozdnyakov and Gibson (2008). Ecological terminology follows Bush *et al.* (1997). The studied specimens are deposited in the Helminthological Collection of Instituto Oswaldo Cruz (CHIOC), Rio de Janeiro, Brazil.

Wedlia retrorbitalis and *W. submaxillaris* present as generic characteristic the body divided into anterior and posterior regions in both sexes with male located in special cavity in female body. Males are smaller than females with strong sexual dimorphism.

Wedlia retrorbitalis (Yamaguti 1970) Nikolaeva, 1978 (Figure 1)

Site and host: Encysted in pairs (one male and one female) in retrorbital adipose tissue from *Thunnus obesus*.

Prevalence and intensity: one of 35 (2.9 %) specimens of *T. obesus* was parasitized by three cists. Voucher specimens deposited: CHIOC n: 37124 a-c.

Description and main measurements based on three males and three females. **Male**: Anterior region of body narrow, more wide and scoop-shaped at oesophageal bifurcation, 2000 – 2600 (2333) long by 700 – 1000 (753) wide at level of oesophagus. Oral sucker muscular, 180 – 380 (260) long by 220 – 400 (310) wide, pharynx absent; oesophagus 100 – 190 (150) long. Posterior region rounded, 1000 – 2000 (1 433) long by 1200 – 1600 (1 333) wide. Testes two, long, tubular, each testis divided into two branches; vas deferens arising for the anterior region of body forming a strongly winding seminal vesicle; genital pore ventral to oral sucker. **Female:** Anterior region of body as in male, 2000 – 4000 (3000) long by 1000 – 1500 (1250) wide; oral sucker, 500 – 840 long by 540 – 840 wide; pharynx absent; oesophagus, 170 – 350 long. Posterior region, 5820 – 11800 (7940) long by 8000 – 13000 (9970) wide, with a special cavity for male. Ovary tubular, divided in two main branches, each of which bifurcates ending in approximately 16 branches. Vitelline gland tubular, divided into several terminal branches. Seminal receptacle opening into genital junction. Uterine coils occupying most

of available space of posterior region. Eggs bean-shaped, operculated, 17 – 20 (19) by 12 (12) wide.

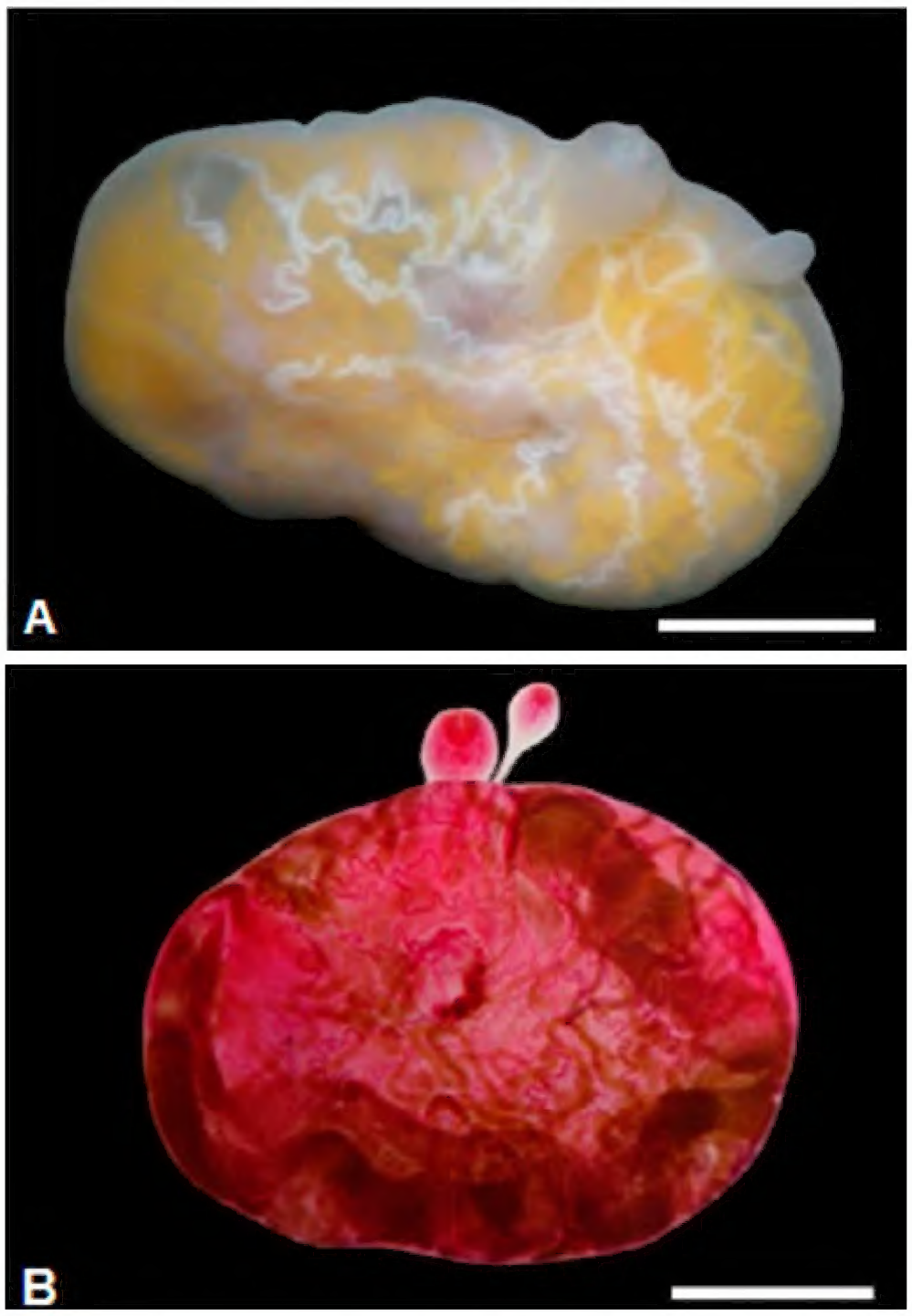

Figure 1. Photomicrographies of *Wedlia retrorbitalis* (Yamaguti 1970); (A) female and male, total view without compression. (B) Female and male, total view stained in alcoholic-acid carmine Bar = 2 mm.

Wedlia submaxillaris (Yamaguti 1970) Nikolaeva, 1978 (Figure 2)

Site and host: Encysted in pairs (one male and one female) in maxillary region from *Thunnus obesus* (Lowe, 1839).

Prevalence and intensity: two of 35 (5.7%) specimens of *T. obesus* were parasitized by one cist each. Voucher specimens deposited: CHIOC n: 37118 a-b, 37119.

Description and main measurements based on two males and two females. **Male**: Anterior region filiform, widest and scoop-shaped at level of oesophageal bifurcation region, 2800 – 4400 long by 660 – 680 wide. Oral sucker, well developed, muscular, 220 – 280 long by 260 – 300 wide; pharynx absent; oesophagus 220 long, bifurcates into two caeca. Posterior region oval, enclosed in hollow of female 850 – 1100 long by 630 – 800 wide. Testes paired, tubular, long and winding with short branches, running along lateral margin of posterior region of body; vas deferens opening ventral to oral sucker. **Female:** Anterior region of body narrow and scoop-shaped as in male, 2000 – 4000 long by 800 – 1000 wide; oral sucker large, muscular, 520 – 750 long by 520 – 800 wide; pharynx absent; oesophagus 200 long bifurcated into caeca. Posterior region of female oval, 3200 – 8000 long by 3800 – 5500 wide, with a special cavity for male. Ovary tubular divided into two branches (right and left) each one ramified in approximately 15 terminal branches, which extend all over the peripheral area of the posterior region of body. Seminal receptacle, 170 – 340 long by 220 – 330 wide. Vitelline gland similar to ovary, with approximately 24 terminal branches. Uterine coils occupying most of available space of posterior region. Eggs' reservoir present. Eggs are bean-shaped, embryonated, operculated, 17 – 20 (19) long by 12 (12) wide.

Figure 2. Photomicrographies of *Wedlia submaxillaris* (Yamaguti 1970); male (m) total view. Bar= 500 µm; female (f) total view. Bar = 2 mm.

Wedlia retrorbitalis and *W. submaxillaris* were originally described by Yamaguti (1970) from *T. obesus* (= *Parathunnus sibi*) and *T. albacares* (= *Neothunnus macropterus*) from Hawaii, Pacific Ocean in the genus *Koellikeria* Cobbold, 1860. In a revision of the subfamily Koellikeriinae, Nikolaeva (1978) considered valid the genus *Wedlia* Cobbold, 1860 and transferred *Koellikeria retrorbitalis* and *K. submaxillaris* to the genus *Wedlia*. In this opportunity *W. retrorbitalis* is reported from the type host (*T. obesus*) for the first time since the original description.

W. submaxillaris, originally described from Pacific Ocean by Yamaguti (1970) was posteriorly reported by Pozdnyakov (1996) from *T. obesus*, *T. albacares* and *Makaira mazara* (Jordan & Snyder 1901) in the same ocean, by Dubina (1985) from *M. mazara* and by Nikolaeva and Dubina (1985) and Mordinova and Nikolaeva (1990) from *Makaira nigricans* Lacepède, 1802 from Indian Ocean. It is now redescribed for the first time in Brazil, representing the first record in South America, Atlantic Ocean.

The finding of these didymozoid species for the first time in the Atlantic Ocean, demonstrated its cosmopolitan distribution, matching the geographical distribution of its host, and showing that tuna fish migration in different oceans may facilitate infections by members of Didymozoidae.

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